

Applicant : R.G.F. Visser and Jean-Paul Vincken
Serial No. : 10/009,876
Filed : December 11, 2001 (I.A. Filing Date June 11, 1999)
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Remarks

With this amendment, applicants cancel all previous claims (1-38) and add new claims 39-58.

The new claims more particularly point out and distinctly claim the invention. In particular, the claims are directed to embodiments, previously claimed and/or described in the specification, that relate to fusion proteins, genetic constructs encoding the fusion proteins, plants transformed with the genetic construct, and plants expressing the fusion protein, where the fusion protein comprises a starch binding domain and an enzyme capable of altering starch or starch granules. Applicants believe that these embodiments are novel and unobvious; that assertion is confirmed in the International Preliminary Examination Report (IPER)(enclosed) of the parent PCT application. The PCT Search Report is also enclosed.

Applicants also believe that the embodiments in the current claims represent only one invention and therefore urge that a restriction of the claims is not necessary or warranted.

Applicants assert that the claims are fully supported in the specification as filed, and that the claim terminology is clear and not indefinite in light of the specification. This assertion is elaborated below.

The definition of the phrase "enzyme that interacts with starch or starch granules" is found at page 6, lines 13-20 and page 9, lines 20-31. Applicants assert that this phrase clearly sets out the metes and bounds of the enzyme element of the claims, simply as an enzyme that uses starch or starch granules as a substrate or a product of the enzyme reaction. Applicants thus believe that the IPER was incorrect in asserting that "any enzyme expressed in the starch granule can be considered to alter the starch or modify its structure" because the skilled artisan, on reading the specification, would understand that the phrase refers to enzymes that use starch or starch granules as a substrate or a product of the enzyme reaction.

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Support for the genetic constructs of claim 39-44 is found at least at original claim 10.

Support for the plants of claim 44-49 is found at least at original claims 13.

Support for the cultivating materials of claims 50 and 55 is found at least at original claims 22 and 25.

Support for the fusion proteins of claim 51-53 is found at least at page 6, lines 10-12.

Support for the plants of claims 54 is found at least at original claim 14.

Support for the methods of claims 56-57 is found at least at original claims 1-7.

Support for the methods of claims 58 is found at least at original claims 16 and 17.

Support for the specific enzymes set forth in claims 40 and 52 is found at least at page 35, line 17-page 38, line 12.

Support for the specific starch binding domain of claims 41 and 53 is found at least at page 12, line 22-page 13, line 10.

Support for the use of the signal sequences of claims 42 and 43 is found at least at page 20, lines 11-22 and page 39, line 3.

Support for the linker sequence of claim 44 is found at least at page 16, lines 10-29 and page 39, lines 10-14.

Support for the recitation of plant parts of claims 46-48 is found at least at original claims 3, 9, 12.

Support for the recitation of specific plant species in claims 49 and 57 is found at least at original claim 4.

Conclusion

Based on the foregoing, applicants believe that the claims are in condition for examination, and request that an examination be conducted at an early date. Should there be any further issues preventing that examination, applicants request that the Patent Office contact the undersigned attorney.

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Since the claims as amended now number 20, of which three are independent, applicants believe that no excess claim fees are due. Applicants thus believe that the \$110 fee for a one-month extension of time is the only fee payment necessary at this time. However, if additional fees are needed to keep this application pending, the undersigned attorney authorizes the withdrawal of those fees from Deposit Account No. 01-1785.

Respectfully submitted,

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Dated: New York, New York
May 6, 2002

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Appendix - Claims As Amended - U.S. Patent Application 10/009,876

39. (New) A genetic construct comprising (a) a first nucleotide sequence encoding an enzyme that interacts with starch or starch granules and (b) a second nucleotide sequence encoding a starch binding domain, wherein the construct is suitable for transforming a plant, and wherein the plant transformed with the construct expresses a fusion protein comprising the enzyme and the starch binding domain.

40. (New) The genetic construct of claim 39, wherein the enzyme is selected from the group consisting of a potato granule-bound starch synthase I (GBSS1), an E. coli glycogen branching enzyme, and a potato kinase R1.

41. (New) The genetic construct of claim 39, wherein the starch binding domain is a starch binding domain of a cyclodextrin glycosyltransferase (CGTase) from Bacillus circulans.

42. (New) The genetic construct of claim 39, further comprising a region encoding a signal sequence, wherein the signal sequence causes the fusion protein to be directed to a starch-containing cell.

43. (New) The genetic construct of claim 42, wherein the signal sequence is the potato GBSS1 signal sequence.

44. (New) The genetic construct of claim 39, further comprising a region encoding a linker sequence, wherein the linker sequence is present in the fusion protein between the enzyme and the starch binding domain.

45. (New) A plant transformed with the genetic construct of claim 39, or a descendent of the plant that expresses the fusion protein.

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46. (New) The plant of claim 45, wherein the fusion protein is expressed in a seed, leaf, root, tuber, stem, fruit, and/or flower of the plant.

47. (New) The plant of claim 45, wherein the fusion protein is expressed in a tuber of the plant.

48. (New) The plant of claim 45, wherein the fusion protein is expressed in a flower of the plant.

49. (New) The plant of claim 45, wherein the plant is selected from the group consisting of potato, sweet potato, cassava, pea, taro, sago, yam, banana, rice, maize, wheat and barley.

50. (New) A seed, tuber, seedling, or other cultivating material from the plant of claim 45.

51. (New) A fusion protein comprising an enzyme that interacts with starch or starch granules and a starch binding domain.

52. (New) The fusion protein of claim 51, wherein the enzyme is selected from the group consisting of a potato granule-bound starch synthase I (GBSS1), an E. coli glycogen branching enzyme, and a potato kinase R1.

53. (New) The fusion protein of claim 51, wherein the starch binding domain is a starch binding domain of a cyclodextrin glycosyltransferase (CGTase) from Bacillus circulans.

54. (New) A plant expressing the fusion protein of claim 51.

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55. (New) A seed, tuber, seedling, or other cultivating material from the plant of claim 64.

56. (New) A method for expressing a fusion protein in a plant, the method comprising transforming the plant with the genetic construct of claim 39.

57. (New) The method of claim 56, wherein the plant is selected from the group consisting of potato, sweet potato, cassava, pea, taro, sago, yam, banana, rice, maize, wheat and barley.

58. (New) A method for increasing the affinity for starch and/or starch granules of an enzyme that can interact with starch or starch granules, the method comprising expressing a fusion protein in a plant, the fusion protein comprising the enzyme and at least one starch binding domain.